

REMARKS:

Claim 5 has been canceled and claims 26-32 added herein. Upon entry of this amendment, claims 2, 6, and 25-32 will be pending in the above-identified application.

Claims 2, 6, and 25

Applicant respectfully requests reconsideration of the rejection of claims 2, 6, and 25 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,330,967 ("Milewski") in view of U.S. Patent No. 5,878,943 ("Nishikawa"). Claims 2, 6, and 25 recite solder bumps formed on the semiconductor chip, **a resin film disposed *directly* on the semiconductor chip and the solder bumps** such that upper surfaces of the solder bumps protrude from the resin layer, a eutectic solder layer disposed on the cleaned upper surfaces of the solder bumps, **a plurality of lands *formed on the mounting board***, and a precoated solder layer disposed on said lands, wherein the eutectic solder layer of the solder bumps and the precoated solder layer join the upper surfaces of the solder bumps to the lands of the mounting board.

Milewski discloses a process for connecting a circuit card 21 to an IC chip 10. Nishikawa discloses a method for removing an oxide or contaminated layer from the surface of a solder material or bonding pad. Milewski and Nishikawa, taken alone or in combination, do not disclose disposing a resin film *directly* on the semiconductor chip and the solder bumps or a plurality of lands *formed on* the mounting board, as claimed. Specifically, Milewski does not show or suggest disposing a resin film *directly* on the solder bumps. Even if the passivation layer 14 of Milewski is considered a resin film (The Office Action states Milewski does not show a resin layer; See lines 11 and 12 of page 3), the layer 14 is not "disposed directly on...(the) solder bumps," as claimed. Instead, the passivation layer 14 is disposed directly against a ball limiting metallurgy (BLM), which contains metallization layers 15 and a flash layer 16 (See Fig. 3 and column 2, lines 58-67). Because the Office Action does not show "a resin film disposed directly on...(the) solder bumps," a *prima facie* case of obviousness has not been made.

Further, although Milewski discloses a tin cap 37 and a layer 14, these elements are not described with respect to the same device. Particularly, the tin cap 37 is part of the device shown in Fig. 4 and the layer 14 is part of the prior art device shown in Fig. 3. The devices have other distinctions as well. For example, in the prior art device, the

solder bump 30 is connected to the chip 10 by way of a BLM 15, 16, a contact 12, and leads 13, but in the device of Fig. 4, the solder ball 35 is connected to the chip 10 by lead 13 and I/O terminal 15. Milewski does not suggest implementing relevant qualities (including the tin cap 37 and layer 14) of the devices together. Without a statement of obviousness connecting unconnected elements, a rejection must show the elements "arranged as required by the claim." See M.P.E.P. § 2131. In other words, because the elements of Milewski relied on in the rejection are part of distinct devices, a rejection based on those elements must include a showing that it would have been obvious to include all of the elements in a single device, as claimed. Because such a showing has not been made, a *prima facie* of obviousness has not been made.

The references also fail to show or suggest "a plurality of lands formed on the mounting board." The lands 53 of Milewski are simply portions of the circuit card 21 and not "formed on" the circuit card. In a natural interpretation of Milewski with respect to the present claims, the pads 51 would be compared to the presently claimed "lands" and the lands 53 would be a land portion (See present claim 31) of the mounting board. This interpretation is substantiated by the reference's teaching that the pad 51 can be coated (See column 2, lines 65-67, Fig. 6, and in column 5, line 67 - column 6, line 1) or uncoated (See column 4, line 65 - column 5, line 5). These teachings are more related to the presently claimed invention than the interpretation the Office Action presents. In any event, because the Office Action does not show "a plurality of lands formed on the mounting board," a *prima facie* case of obviousness has not been made. (See M.P.E.P. § 2143.03).

Further, Milewski *teaches away* from implementing a precoated land and a coated solder ball together, as the express purpose of Milewski is to obviate the need for both. Under the more natural interpretation of Milewski mentioned above, the pads 51 are compared to the lands of the present claim. Milewski clearly states the "pads 51 are substantially free of deposited solder alloy" and a coated solder ball is implemented *in lieu of* a coated pad. (Column 4, line 47 - column 5, line 5). Substantiating Milewski's teaching away from using a pre-coated pad and a coated solder ball, another embodiment of the reference (Shown in Fig. 6) discloses a coated land for use "*instead of* a coated solder ball (See column 5, line 64 - column 6, line 1 (emphasis added)). Still

another example of Milewski teaching away from using both a coated pad and a coated solder ball is at column 5, lines 37-40, which states, "The SN-rich cap 37 serves as the Sn supply for eutectic formation, *thereby obviating the need for a Pb/Sn electroplate on the pads.*" (emphasis added). Thus, Milewski at least thrice clearly states that a coated solder ball *or* a coated pad can be used, but not both. Milewski purposely obviates the need for both a coated solder ball and a coated pad, and thus teaches away from such use. Because Milewski teaches away from the use of a coated pad and a coated solder ball together, it is not reasonable to combine Milewski's teaching of a coated pad and a coated solder ball. (See M.P.E.P. § 2141.02, stating, "(a) prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention." (emphasis in original)).

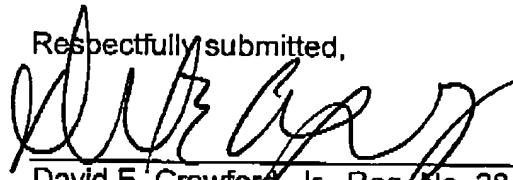
Because the Office Action fails to make a *prima facie* case for a Section 103(a) rejection of claims 2, 6, and 25 and the primary reference teaches away from the claimed invention, the rejection is improper. Accordingly, Applicant respectfully requests the rejection of these claims be withdrawn. If Examiner wishes to maintain the obviousness rejection, Applicant requests Examiner do so in a new non-final Office Action clearly establishing a *prima facie* case.

Conclusion

As it is believed that the application is in condition for allowance, a favorable action and Notice of Allowance are respectfully requested.

Dated: January 6, 2005

Respectfully submitted,



David E. Crawford, Jr., Reg. No. 38,118
Customer No. 26263
314.259.5810